DATA SHEET

TracePro® Optimization Module

To improve performance and optimize geometry of illumination systems in TracePro

FEATURES AND BENEFITS

Adhere to methodical design process - quickly generate starting designs and test number of design alternatives.

Realize the optimization flexibility to benefit breath of applications.

Shorten the product development cycle by automating design iteration steps

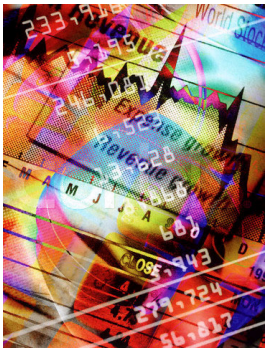
Utilize the optimization flexibility of the module; modify analysis functions and define custom merit functions for arbitrary number of optimizations to create user-defined performance criteria.

Validate the final design iteration and its performance and reach product specifications quickly.

TracePro®

Lambda Research Corporation

Optimizing Illumination Systems



Modeling illumination systems is a complex task that is facilitated with automated algorithms that systematically vary the model's geometric parameters to achieve optimum illumination distributions. These algorithms allow users to quickly generate starting designs, test design alternatives, and validate the final design iteration and its performance criteria.

TracePro

TracePro is a comprehensive, versatile software tool for modeling the propagation of light in opto-mechanical systems. Models are created by importing from a lens design program or a CAD program or by directly creating the solid geometry in TracePro. Source rays propagate through the model with portions of the flux of each ray allocated for absorption, specular reflection and transmission, fluorescence and scattering.

From the model, analyze:

- Light distributions in illumination and imaging systems
- Stray light, scattered light and aperture diffraction
- Throughput, loss, or system transmittance
- Flux or power absorbed by surfaces and bulk media
- Light scattering in biological tissue
- Polarization effects
- Birefringence effects
- Fluorescence effects

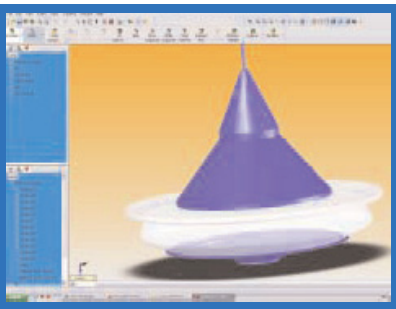
TracePro Optimization Add-In

TracePro's Optimization module is a non-linear optimization module based on TracePro's macro language, Scheme. The module consists of two components: a program that manages the request to optimize a set of parameters and macros that perform and analyze changes in the model. Maximum flexibility and optimization versatility is achieved by utilizing TracePro's macro language to set-up the model. Optimization is done outside the macro processor, however, to realize fast calculations. With the optimization module, users significantly accelerate the iterative design process while increasing optical analysis efficiency and productivity in illumination system design – all without sacrificing control over the design process.

Lambda Research Corporation
25 Porter Road
Littleton, MA 01460 USA
Phone: 1-978-486-0766
Fax: 1-978-486-0755
Email: sales@lambdares.com
www.lambdares.com

TracePro® Optimization Module

To improve performance and optimize geometry of illumination systems in TracePro



TRACEPRO TRAINING PROGRAMS

Lambda Research Corporation offers TracePro training courses to assist current and prospective users with their optical design and analysis challenges. Explore the power and versatility of TracePro, maximize your investment and draw on the technical expertise and industry-specific knowledge of Lambda Research instructors.

TRACEPRO MAINTENANCE SUBSCRIPTIONS

Sustain the competitive advantage that TracePro delivers with a maintenance subscription. TracePro's ongoing innovations are provided throughout the year in software downloads that include a variety of updates and enhancements to the current software. Subscriptions also include phone and e-mail technical support, and optional enrollment in Lambda Research's Early Access program where users have early access to software updates.

ENGINEERING SERVICES

Leverage expert optical design engineering and custom software development services including custom macro development to accommodate your specific applications

OPTIMIZING ILLUMINATION SYSTEMS

Optimize light distribution intensity, uniformity or both

The optimization capability of the software can be used to optimize various system performance parameters; in this case, intensity and uniformity oriented optimization is demonstrated on the example of condenser for fiberoptic light guide (Fig1). The first setup with plano-convex lens leads to 10% system performance. By switching from plano-convex to an aspherical lens, the setup leads to 3.5-fold increase in light intensity. At this point, the user can choose either one parameter for the optimization or both parameters can be used as a merit value for the optimization.

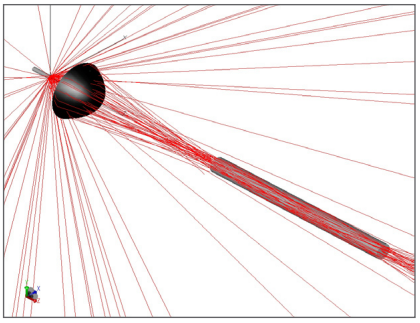


Figure 1: Condenser for fiberoptic light guide

Optimize for application-specific irradiance distribution

Now we optimize for maximized light intensity distribution in the condenser system. With the intensity optimized to maximum, the irradiance distribution shows loss in light intensity near the light guide edges. The approximate 60% of intensity decay around the edges of light guide is not suitable for every application. Therefore we continue to optimize the design and change the weights from intensity to uniformity optimization (Fig2).

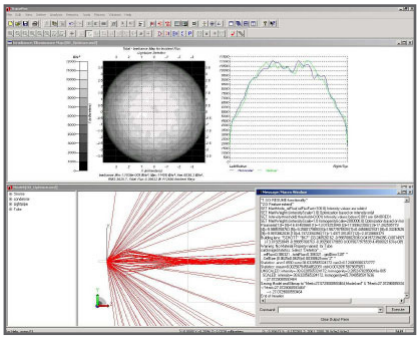


Figure 2: Optimized on light intensity only

Optimize for application-specific light distribution intensity and uniformity

Now we optimize for light uniformity distribution after we already optimized the system on light intensity. The approach yields condenser system with maximized uniformity of light distribution with loss of less than 10% in uniformity with nearly the same level of light intensity (Fig3).

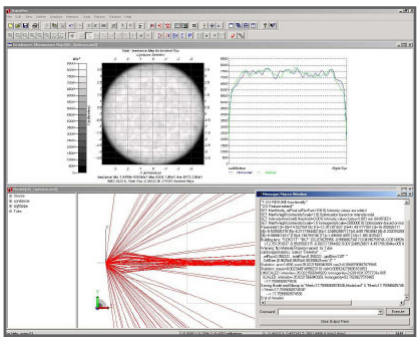


Figure 3: Optimized on light intensity and uniformity.

Lambda Research Corporation

IB/E OPTICS

D/S 2007/6